AGRICULTURAL JOB MARKET REPORT

November 2023 Report

PURDUE UNIVERSITY. | **Agricultural Economics**
COLLEGE OF AGRICULTURE

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Executive Summary

PURPOSE

Purdue University's Department of Agricultural Economics started collecting data on agricultural job postings during the summer of 2021. This data is collected every 4 weeks, and this report represents an overview of the agricultural job market over time. The data extends from June 2021 to November 2023. The Agricultural Job Market Report provides a measurement of the current state of agricultural job openings.

ABOUT THIS REPORT

Google's job search engine pulls job postings from thousands of separate job boards. These job boards can be company specific as well as common job posting sites like LinkedIn and Glassdoor. On Google's job search engine, LinkedIn is the most popular job board for agricultural jobs that are found in the data.

JOB TRENDS

Agricultural Job postings were collected 20 times between June 16, 2022, and November 29, 2023. On average, there are 2595 new job openings every four weeks. There were 2591 new job openings on Google between November 1, 2023, and November 29, 2023. This was the third collection date in row that new job postings have declined. Job postings and opening both decreased at each collection date in November 2023 ending three months of increases.

SALARY

The average agricultural job salary over the past 18 months is $55,433, which is below the average salary for all jobs in the United States, according to Forbes.
On November 29, 2023, Jobs in academics, economics, and research are among the highest paying jobs in agriculture. Additionally, remote jobs had the highest average salary, followed by the Northeast.
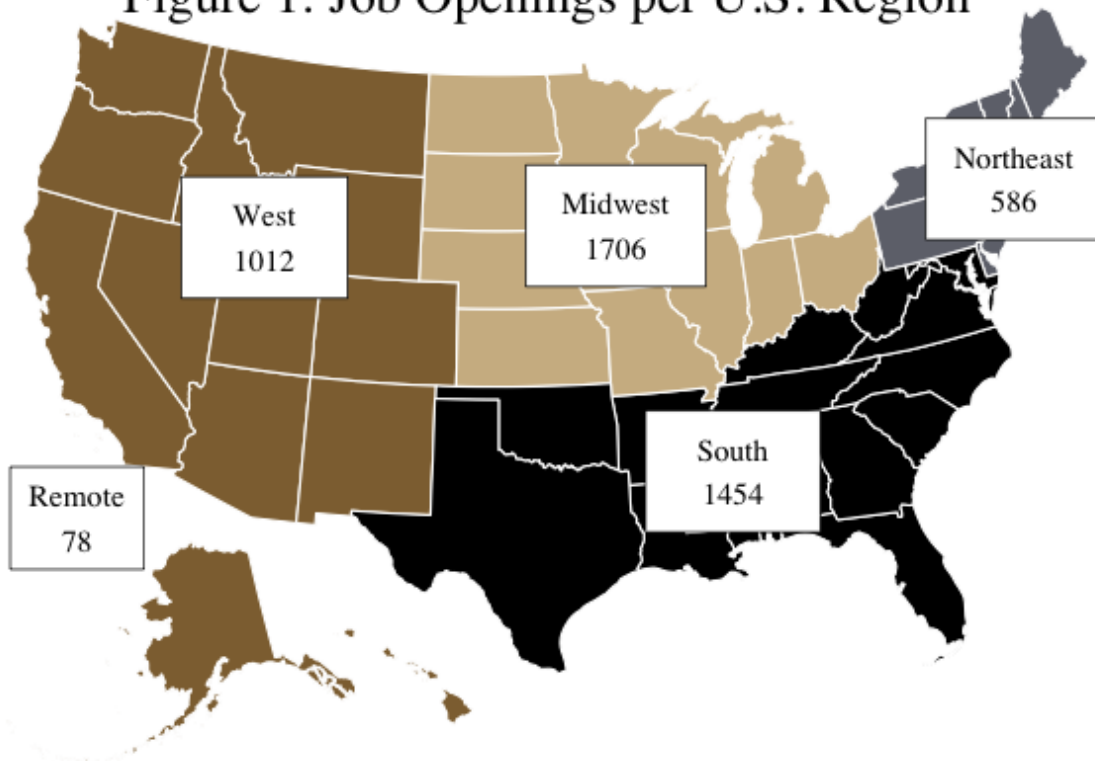
DESCRIPTION ANALYSIS

Experience is mentioned in the description 87% of agricultural job making it the most common requirement on November 29, 2023. The most common types of job openings between June 2021 and November 2023 are engineering and business administration. The percentage of new positions which were internships has decreased in November following increases in both September and October.

Job Postings and Openings

In the report, "job posting" refers to any separate occurrence of a job advertisement for an individual job. Any representation of a single specific job opportunity of a company will always be phrased as a "job opening". Some companies have existing career pages on their website but continue to post to job boards, like LinkedIn and ZipRecruiter. Companies post to multiple job boards to cast a wider net for potential hires.

Figure 1 illustrates the amount of job openings for each region of the United States. There were 5127 total job postings for 4836 unique jobs on November 29, 2023. The most jobs openings were in the Midwest and South, with each region including at least 30% of the total job postings. Relative to the collection on October 4, 2023, opening in the West and remote openings increased. Openings in the Midwest, South, and Northeast decreased.
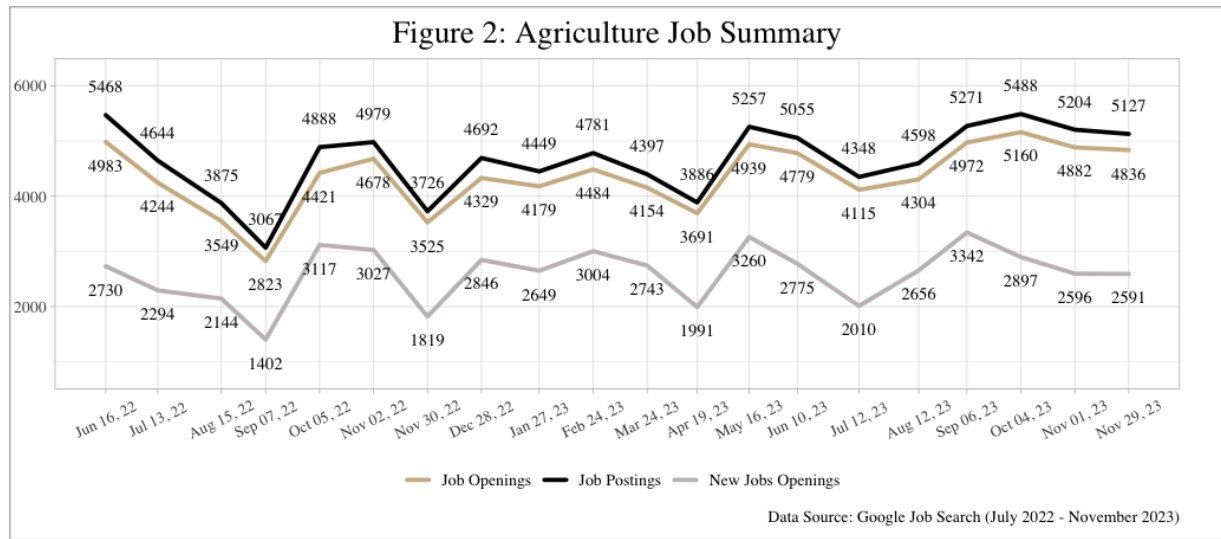
Figure 1: Job Openings per U.S. Region

West 1012

Midwest 1706

Northeast 586

South 1454

Remote 78

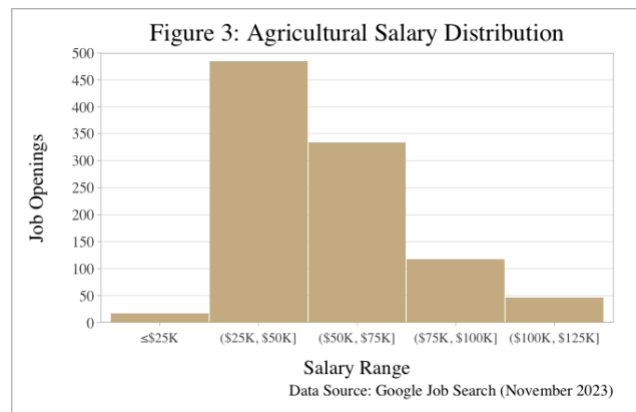Data Source: Google Job Search (November 2023)

Job Trends

Figure 2 represents 18 months' worth of job posting collections for every four weeks from June 16, 2022, to November 29, 2023. On average there were 2595 new openings present every four weeks. Following three straight months of increase, job postings and openings both decreased at both collection dates in November. Postings and openings are still above the 18-month averages of 4660 and 4352, respectively. Over the last 18-months, there has been approximately 1.07 posting per opening. Each unique job observed in a collection that was not present in the previous collection is considered a new job. For the third collection in a row, the number of new job openings has decreased, which has led to new job openings on November 29, 2023, being lower than the 18-month average of 2595.

Figure 2: Agriculture Job Summary

Salary

The national median salary computed for the last 18 months was $48,214/year, and the average salary was $55,433/year. It is important to note that only 17% of job openings included salary information. Figure 3 illustrates the distribution of salary among agricultural job openings. According to ZipRecruiter, the national average salary for agricultural related jobs is $47,483/year. The average salary for all occupations is $59,482/year, according to Forbes.

Figure 3: Agricultural Salary Distribution
Data Source: Google Job Search (November 2023)

SALARY BY CATEGORY

The distribution of salaries varies across the different subsectors of agricultural jobs, as shown in Table 1. Jobs in economics ($66,057/year), academics ($65,785/year), and research ($63,278/year), have the highest average salary. Animal science jobs had the lowest average income with an annually salary of $47,069.
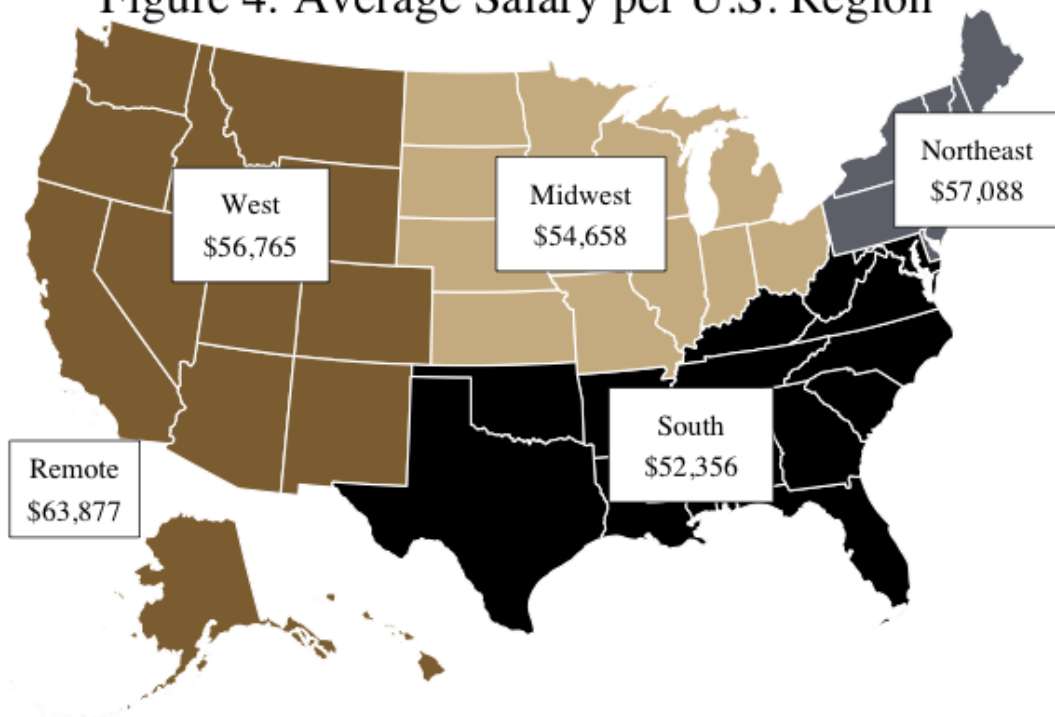
Table 1 Job Category by Title	Average Salary	Median Salary
Academic	$65,785	$70,000
Agronomy	$56,008	$53,222
Animal Science	$47,069	$46,690
Business Administration	$59,875	$51,362
Economics	$66,057	$63,465
Education	$52,465	$50,000
Engineering	$60,147	$60,320
Farming	$50,719	$53,250
Food Science	$49,796	$41,250
Lending and Finance	$52,120	$37,696
Natural Resources	$52,784	$47,358
Nondescript Titles	$48,687	$35,694
Research	$63,278	$65,000
Sales	$62,677	$51,362
Non-Specialized Work	$49,370	$43,985
Google Job Search (November 2023)		

SALARY BY REGION

Average salaries vary by region. Figure 4 illustrates the vartiation in average salaries across the U.S. Fully remote jobs have the highest listed salary at $63,877/year. The Northeast has the 2nd highest average salary listed in job postings at $57,088/year, followed by the West at $56,765/year. The fourth highest average salary by region is the Midwest at $54,658/year, followed by the South at $52,356/year. Relative to the average regional salaries in October, the Midwest, West, and South saw salaries increase, while remote and Northeast average salaries decreased.
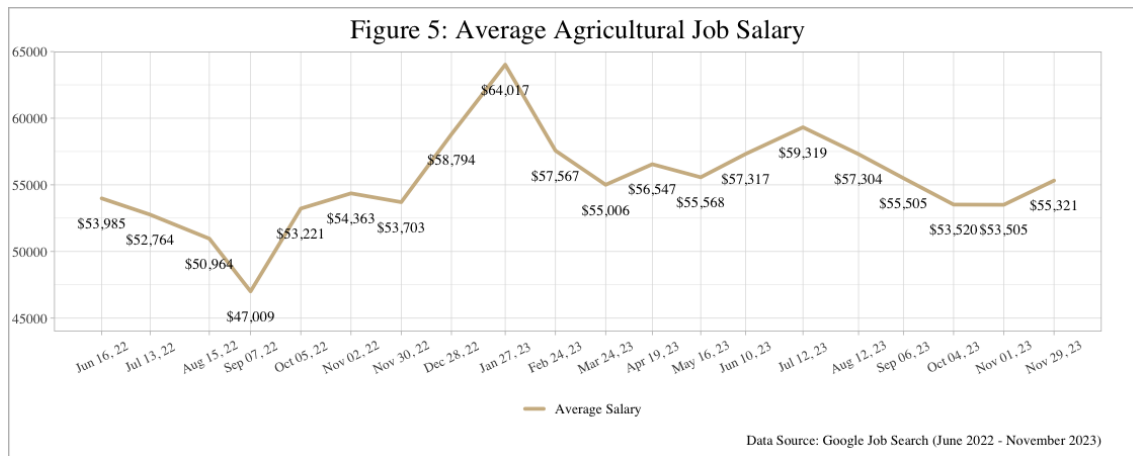

Figure 4: Average Salary per U.S. Region

West
$56,765

Midwest
$54,658

Northeast
$57,088

Remote
$63,877

South
$52,356

Data Source: Google Job Search (November 2023)

SALARY TRENDS

The average salary for observed agricultural jobs over the last 18 months are depicted in Figure 5. The 18-month high was just above $64,000/year in January 2023. More recently, average salaries peaked in July 2023 at $59,319/year. Prior to the collection on November 29, 2023, average salaries had decreased for four straight period.

Figure 5: Average Agricultural Job Salary

Description Analysis

KEYWORDS

The data can be grouped by mentions within job descriptions. Table 2 reports the percent of job openings that include each word or some variation of it. The top three terms are farming, sales, and natural resources, which are all mentioned by over half of the jobs.

Table 2 Keywords	Job Openings that Mention
Academic	8.10%
Economics	24.90%
Ag Education	6.60%
Engineering	19.60%
Sales	54.00%
Agronomy	49.20%
Animal Science	21.70%
Farming	66.20%
Food Science	18.60%
Natural Resources	54.00%
Google Job Search (November 2023)	

REQUIRED SKILLS

Table 3 shows the average percentage of mentions for specific job requirements. Experience is required by 87% of jobs, while over 50 percent of jobs also require leadership, communication, education, and travel. The required skills and experiences are found across multiple different subsectors of agricultural jobs.

Table 3 Requirements	Job Openings that Mention
Communication	72.10%
Critical Thinking	17.60%
Data	28.30%
Education	65.30%
Experience	87.10%
Leadership	74.50%
Microsoft	41.30%
Public Speaking	34.70%
Programming	9.40%
Quantitative	29.40%
Remote Work	14.00%
Teamwork	46.90%
Travel	59.20%
Google Job Search (November 2023)	

DESIRED EDUCATION

Table 4 reports the percent of jobs postings in agriculture that mention each desired level of education by applicants. To be included, the educational term must be explicitly written in a job description. Generally, a low share of agricultural jobs indicate a required education. According to Table 4, a high school degree, the most cited degree requirement, is mentioned in 22% of agricultural job postings.

Table 4 Desired Education	Job Openings that Mention
High School	22.60%
Associates	2.50%
Bachelors	18.00%
Masters	8.50%
PhD	6.80%
Google Job Search (November 2023)	

JOB BENEFITS

The key terms related to job benefits are in Table 5. These include the broad terms of benefits, diversity, equal opportunity, tuition reimbursement, and 401(K). In the same way companies may not post salaries with online listings, they may also not report all the relevant benefits. These numbers should serve as guides to understand what is being displayed in job descriptions but are unlikely to fully capture the benefit packages offered by agricultural employers. We can see that most agricultural job postings use the general term "benefits" in the description, but few references specific benefits such as 401(K) and tuition reimbursement. Additionally, 86% of jobs included mention of equal opportunity.
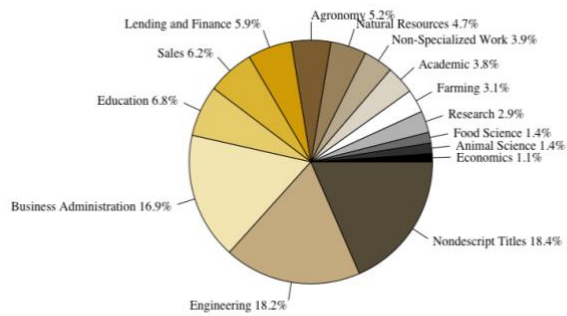
Table 5 Benefits	Job Openings that Mention
Benefits	63.30%
Diversity	24.90%
Equal Opportunity	86.40%
Tuition Reimbursement	6.40%
401(K)	8.90%
Google Job Search (November 2023)	

JOB CATEGORIES

Jobs can be classified based upon terms written in job posting titles. The pie chart in Figure 6 shows the breakdown of agricultural job categories from June 2022 to November 2023. The most common job types are engineering (18%), business administration (17%), education (7%), and sales (6%). Job titles that could not be classified make up 18% of agricultural job postings.

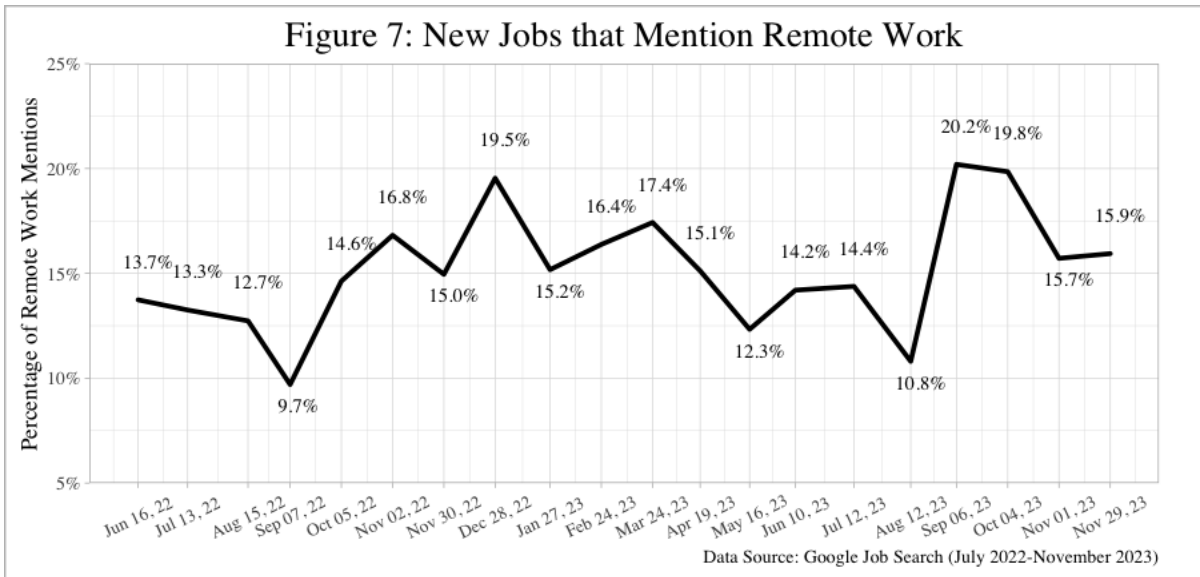**Figure 6: Job Categories by Keywords in Title**

Data Source: Google Job Search (June 2022-November 2023)

REMOTE WORK

At the beginning of 2020, the Covid-19 pandemic disrupted in-person and office-based work. To slow the spread, companies that were able to work remotely pushed for the safer alternative of tele-work. Though the pandemic has ended, the benefits of and opportunity for remote work have continued. Figure 7 depicts the percent of new jobs in each collection that mention remote work. Mentions of remote fluctuate from collection to collection. In November 2023, new jobs mentioning remote work decreased following a two-month spike in September and October 2023. Remote mentions are still above 15% in November. Prior to September 2023, that had not been the case since April 2023.

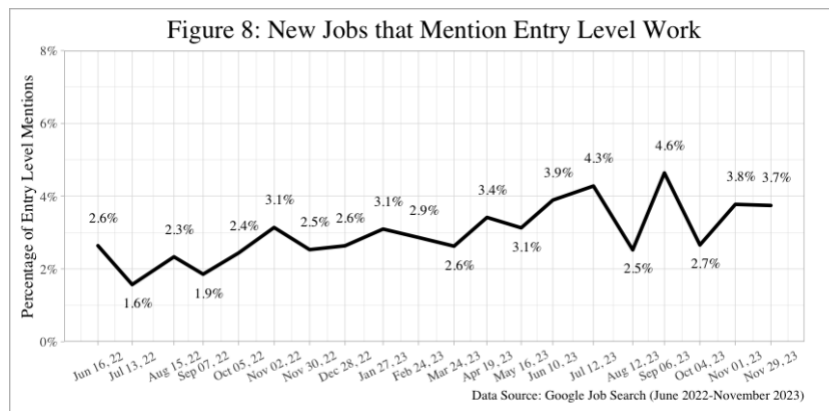Figure 7: New Jobs that Mention Remote Work

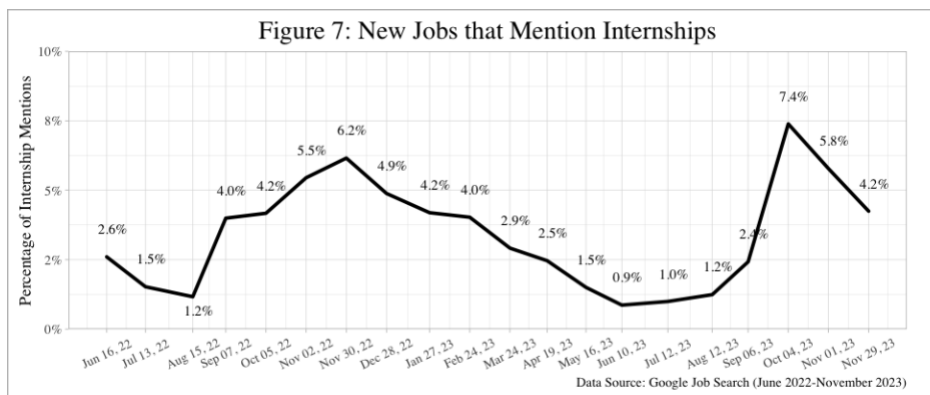Data Source: Google Job Search (July 2022-November 2023)

NEW ENTRY LEVEL OPENINGS

The percent of new jobs that mention entry level work since June 2022 is shown in Figure 8. From June 2022 to November 2023, between 1.6% and 4.6% of new openings have mentioned entry level work. It is hard to recognize any monthly trend as there are never more than two consecutive months of increased or decreased mentions. There has been a general increase in entry level job openings over the last 18 months, but monthly variation has also increased.

Figure 8: New Jobs that Mention Entry Level Work
Data Source: Google Job Search (June 2022-November 2023)

NEW INTERSHIP OPENINGS

Internships are often filled by current college students that are looking to gain experience for their future career or meet a degree requirement. As a result, these types of job openings often follow the academic calendar. Figure 9 shows the percent of new jobs that mention internship between June 2022 and November 2023. Internship mentions are cyclical, increasing in the fall as companies seek students to employ and slowly decrease as the summer positions are filled. Internship openings seemed to peak in October 2023 which is earlier than the November peak in 2022.

Figure 7: New Jobs that Mention Internships
Data Source: Google Job Search (June 2022-November 2023)

Appendix

DATA COLLECTION

For this research, data was collected through Google's job search engine utilizing an Application Programming Interface (API) provided by SerpApi. The data collected for the report includes job title, company name, description, salary (if posted), posting date, and original job board site name.

Not all online job postings appear on Google's job search engine and as a result the data discussed in the report should be treated as a sample of job openings existing within the agriculture industry. Indeed.com, the number 1 job site in the world, does not share job posting data with Google. Google's job search engine represents only a fraction of jobs posted online. Job postings can be posted on multiple job boards such as LinkedIn, Glassdoor, as well as company websites that allow Google's Cloud Talent Solution to analyze their job postings and display them on Google's job search engine.

Job postings that are available on Google's job search engine are curated to best fit the search terms of the user. The data in this report was collected using a general search term of "agriculture". Data presented in this report could impose bias that is specific to Google's job search engine data. Although possible, we believe the data collected is valuable for industry employers as a metric for comparing company hiring to the agricultural industry. Therefore, this report is an analysis of Google's data and is not fully representative of the agricultural job market.

Note that not all online job postings appear on Google's job search engine. Job postings can be posted on multiple job boards such as LinkedIn, Glassdoor, as well as company websites that allow Google's Cloud Talent Solution to analyze their job postings and display them on Google's job search engine. Job postings that are available to Google's Cloud Talent Solution are curated to best fit the search terms of the user. For this study, the search term included: "agriculture." This allows for a broad variety of jobs to be collected that exist within the agricultural job market. The data discussed in this report represents all job postings in the United States collected from Google's job search engine from June 2021 to November 2022. Google's job search engine is a conglomerate of multiple online job boards. Within the data, no jobs were collected from Indeed.com. Indeed.com does not allow Google access to their job board unlike other popular job sites. Google must be granted access to a company's job

posting before advertising on Google's job search engine. Many job openings appear on multiple job boards at a given time to get more advertising to potential employees.

Google's job search engine hosts thousands of job boards' data. Due to the immense amount of job boards available, job advertising is a competitive market. Companies seeking premium talent should post to the more popular job boards which produce more traffic.

DESCRIPTION ANALYSIS

From the data, each job posting has a description. Text mining was used to pull information from these descriptions, and it is possible to quantify the amount of mentions of specific characteristics. We were able to extract salary if not already mentioned, subsector information, requirements, and education. The categories were found using the "bag of words" technique. A list of words was created to represent any similar phrases and synonyms that represent a characteristic of interest. For example, quantitative skills would be marked as appearing in a job posting if terms appear in the description such as "quantitative", "analysis", "prediction", "mathematics", and "statistics." These terms are represented as nouns, verbs, and adjectives to catch all forms of context that might be represented in written language. Descriptions are then searched to evaluate if any of these terms were mentioned. If a term was mentioned once or more, the description was tallied as mentioning those specific characteristics.

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Keywords (Related to Table 2)	Word List
Academic	Company name must contain "college", "university" and Description must contain "professor", "dean", "university", "academic"
Economics	"ag economics", "agriculture economics", "economic", "ag business", "agricultural business", "agri-business", "econometric", "market", "market research", "market analysis", "loan", "credit", "lending"
Ag Education	"ag education", "agricultural education", "ag ed", "extension educator","ffa", "future farmers of america", "4-h","ag teacher", "agricultural teacher"
Engineering	"ag engineering", "agricultural engineering", "ag systems management", "agricultural systems management", "asm", "mechanic", "diesel mechanic"
Sales	"ag sales", "agricultural sales", "sales", "sell", "customer", "account", "seller", "buyer", "selling", "buying", "commission"
Agronomy	"agronomy", "agronomist", "corn", "soybeans", "soil", "seed", "crop", "crop adviser", "row crop"
Animal Science	"animal science", "animal", "veterinarian", "sheep", "cattle", "dairy", "swine", "pig", "pork", "beef", "livestock", "breed", "poultry", "equestrian", "horse"
Farming	"farming", "farmhand", "planting", "plant", "harvest", "harvester", "farm", "forage", "combine", "farmer"
Food Science	"food science", "food production", "meat packing", "butcher", "food distribution", "food handling", "food processes", "food product", "meat", "produce"
Natural Resources	"natural resources", "conservation", "wildlife", "environment", "environmental", "ecosystem", "forest", "raw materials", "nature", "energy", "pollution", "renewable"

Requirements (Related to Table 3)	Word List
Communication	"communication", "communicate", "talk", "call", "email", "explain", "present", "speak"
Critical Thinking	"critical thinking", "problem solving", "analysis", "deliberate", "brainstorm", "reasoning"
Data	"data", "data analysis", "big data", "data analyst", "data wrangling", "data collection"
Education	"degree", "degrees", "college", "graduate", "undergrad", "doctorate", "phd", "bachelor", "bachelors", "education", "gpa"
Experience	"work experience", "experience", "training", "prior job", "familiarity", "practice", "knowledge", "background", "exposure to", "understanding of"
Leadership	"leadership", "lead", "leading", "leader", "manager", "management", "mentor", "supervision", "supervisor", "supervise"
Microsoft	"excel", "spreadsheet", "microsoft", "word", "powerpoint", "outlook"

Public Speaking	"public speaking", "speaking", "speech", "speeches", "speak", "present", "presentation"
Programming	"coding", "code", "python", " r ", "sql", "java", " c ", "computing", "algorithm"
Quantitative	"quantitative", "analysis", "analyze", "analyst", "insight", "predict", "prediction", "predictive", "math", "mathematics", "statistics", "statistical", "optimization", "optimize", "regression"
Remote Work	"remote", "remote working", "home office", "work from home", "work at home"
Teamwork	"collaboration", "team", "teams", "teamwork"
Travel	"travel", "drive", "driving", "fly", "flying"

Desired Education (Related to Table 4)	Word List
High School	"high school"
Associates	"associate's", "associate degree", "associates's degree"
Bachelors	"bachelors", "bachelor's degree", "bachelor degree"
Masters	"masters", "master's degree", "master degree", "grad school", "gradschool", "graduate degree", "advanced degree"
PhD	"phd", "p.h.d", "ph.d", "doctorate", "doctoral degree"

Other Requirements (Related to Table 5)	Word List
Benefits	"medical", "dental", "vision", "ad&d", "ad and d", "accidental death and dismemberment", "std", "short term disability", "short-term disability", "ltd", "long term disability", "long-term disability", "vacation", "holiday", "disability", "health insurance", "health savings account", "life insurance", "paid time off", "pto", "referral program", "retirement planning", "retirement"
Diversity	"diverse", "diversity"
Equal Opportunity	"equal opportunity", "without regard", "religion", "sex", "color", "age", "race"
Tuition Reimbursement	"tuition"
401(K)	"401k","401 k","401(k)"

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Category (Related to Figure 6 and Table 1)	Word List
Academic	"professor", "dean", "academic", "college", "adjunct", "tenure", "chair", "post doc", "postdoc", "faculty"
Agronomy	"agronomy", "agronomist", "corn", "soybeans", "soil", "seed", "crop", "grain", "cultivation", "greenhouse", "irrigation", "appraiser", "horticulture", "fertilizer", "pesticide", "fungicide", "herbicide", "applicator", "sprayer", "botanist"
Animal Science	"animal science", "animal", "veterinarian", "veterinary", "sheep", "cattle", "dairy", "swine", "pig", "pork", "beef", "livestock", "breed", "poultry", "equestrian", "horse", "bovine", "ranch", "farrowing", "feedlot", "grazing", "dairies", "milking", "egg gatherer", "herdsman", "herdsperson"
Business Administration	"business", "market", "administration", "manager", "management", "admin", "program tech", "supervis", "retail", "coordinator", "operation", "purchas", "bookkeeper", "human resource", "customer service", "receptionist", "executive assistant", "product specialist", "recruit", "executive director", "inventory specialist", "it specialist", "legal", "attorney", "law", "corporate", "commercial", "secretary", "consultant", "trader"
Economics	"economic", "economist", "econometric", "statistician", "risk", "economy", "commodity", "price", "pricing", "policy specialist", "policy analyst", "policy"
Education	"ag education", "agriculture education", "agricultural education", "educator", "teach", "teacher", "class", "classroom", "ffa", "4-h", "4h", "ag teacher", "teaching", "extension educator", "future farmers of america", "ext agent", "extension"
Engineering	"engineering", "engineer", "mechanic", "diesel", "equipment", "service tech", "service manager", "maintenance tech", "production tech", "electrical tech", "precision tech", "repair", "construction", "mechan", "weld", "precision", "digital ag", "technology"
Farming	"farming", "farmhand", "planting", "plant", "harvest", "harvester", "farm", "forage", "combine", "farmer"
Food Science	"food science", "food production", "meat packing", "butcher", "food distribution", "food handling", "food processes", "food product", "meat", "produce", "food", "nutrition", "sugar"

Lending and Finance	"loan", "credit", "lender", "lending", "bank", "finance", "accountant", "accounting", "tax", "budget", "financial", "investment", "insurance", "account", "underwriter", "audit", "collateral"
Natural Resources	"natural resources", "conservation", "wildlife", "environment", "environmental", "ecosystem", "forest", "tree", "raw materials", "nature", "energy", "pollution", "renewable", "fire", "climate", "natural", "sustainable", "resources", "surveyor", "fish", "microbiologist", "geologist", "biologist", "biological"
Nondescript Titles	All jobs that do not match any of the other categories. Top 2 titles shown include: "Agriculture Technician" and "Agricultural Program Specialist"
Research	"research", "laboratory", "science", "scientist", "chemistry", "chemist", "lab", "chemical"
Sales	"sale", "seller", "buyer", "selling", "buying"
Non-Specialized Work	"operator", "manufacture", "package", "production", "transport", "driving", "driver", "cdl", "labor", "seasonal", "worker", "forklift", "process", "inspector", "investigator", "pest control", "security", "yard person", "quality assurance", "clean", "mow", "lawn", "assembler", "helper", "warehouse", "landscape", "landscaping", "yard"

States in Each Region from Figure 1 and 4	
Midwest	IN, IL, MI, OH, WI, IA, KS, MN, MO, NE, ND, SD
Northeast	CT, ME, MA, NH, RI, VT, NJ, NY, PA
South	DE, FL, GA, MD, NC, SC, VA, WV, AL, KY, MS, TN, AR, LA, OK, TX, DC
West	AZ, CO, ID, NM, MT, UT, NV, WY, AK, CA, HI, OR, WA

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